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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/964,586	09/28/2001	Kristopher Frutschy	219.40442X00(ATSK)	2404
21186	7590	11/30/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH 1600 TCF TOWER 121 SOUTH EIGHT STREET MINNEAPOLIS, MN 55402			PAREKH, NITIN	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 11/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/964,586

Applicant(s)

FRUTSCHY ET AL. *AK*

Examiner

Nitin Parekh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,3,7-9,65-76,78,79,84,85,89 and 91 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 7,9,65-76,78,79,84,85,89 and 91 is/are rejected.
- 7) ☒ Claim(s) 2,3 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attach/Int(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The indicated allowability of claims 2, 3, 7-9, 65-76, 78, 79, 84, 85, 89 and 91 is withdrawn in view of the newly discovered reference(s). Rejections based on the newly cited reference(s) follow:

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 7, 9, 65-76, 78, 79, 84, 85, 89 and 91 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dibene, II et al. (US Pat. 6452113) in view of Dibene, II et al. (US Pat. 6452804), Belady (US Pat. 6285550) and Hembree et al. (US Pat. US Pat. App. Pub. 2001/0001542).

Regarding claims 76, 78, 79, 84, 85, 89 and 91, Dibene, II et al. ('113 patent) disclose a power module (see 600 in Fig. 6A/6B) having integrated circuits (IC)/an IC package comprising:

- a substrate (702 of an assembly 700 in Fig. 9 and 7) supporting the microprocessor/IC die (310 in Fig. 7; Col. 8, line 66) on the IC die of the substrate

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- the power module (600/602 in Fig. 6A-9) comprising a packaged circuit board (PCB)/package frame (602 in Fig. 6A/6B and 9; Col. 8) mounted/attached at a peripheral area and above a perimeter of the substrate (see Fig. 9 and Fig. 7; Col. 4, lines 25-28; Col. 8, lines 60-68; Col. 9, line 25) and arranged on the die-side of the substrate apart from the IC die on the substrate, and
- the power module providing a low impedance, low inductance power/current path to the die through the circuit components and electrical connectors (see 608A/608B and 612A/612B respectively in Fig. 6A/6B); and being functional as a power/ground impedance deliverer (PGID) to provide power/ground impedance delivery path/circuit (Col. 7, line 53- Col. 9, line 37)

(Fig. 6A-12; Col. 7, line 50- Col 10, line 25).

Dibene, II et al. ('113 patent) further teach:

- the electrical connections/structure providing dual functions including a mechanical and electrical functions where the mechanical function includes the conductive interconnects providing a coupling/rigidity/support for the substrate (Col. 8, lines 50-60) and mechanical fasteners (802 in Fig. 9) providing the predetermined level of mechanical fastening/stiffening (Col. 9, lines 32-37), and
- a variety of module assembly configurations including an embodiment where the package frame (see 2204 in Fig. 22) is positioned/mounted/attached at a peripheral/corner area including a perimeter of the substrate and extends along

the perimeter and two side edges of the substrate (see 2204 and 2202 in Fig. 22; Fig. 22-25; Col. 14, line 16- Col. 15, line 22).

Dibene II, et al. ('113 patent) fail to explicitly teach:

- a) the PCB/package frame being a package stiffener which includes a capacitor including an insulator, and
- b) a power pod/plurality of power pods supplying the power to the IC die.

a) Dibene, II et al. ('113 patent) further teach another embodiment of Fig. 12, where an entire assembly including the PCB/package frame and a motherboard/stiffener board provides further support and stiffening for the components of the assembly (Col. 10, lines 8-25) such that the PCB/package frame and the motherboard/stiffener board function as the package stiffening components.

Dibene, II et al. ('804 patent) teach an integrated circuit (IC) package having an interposer substrate (104 in Fig. 1) supporting the microprocessor/IC die (101 in Fig. 1) where a power regulator PCB/electrical conductor assembly (102/103 in Fig. 1) delivering a low inductance current provides a mechanical/fastening support to the interposer substrate through non-compressible mechanical stand-offs/conductors (103 in Fig. 1; Col. 5, line 25; Col. 5, lines 25- 55). An entire assembly of the power regulator PCB/electrical conductor and a motherboard provides further support and stiffening for the components of the assembly such that the power regulator PCB and the

motherboard function as the package stiffening components for the three-dimensional integrated architecture/configuration (Col. 5, line 53- Col. 7, line 25).

Hembree et al. teach a power supply delivery carrier/system comprising a variety of configurations including capacitors (see 38, 38A, etc. in Fig. 4-4E and 12) having electrodes connected to the desired power/ground path in a base substrate or an interconnect of the system/carrier, the capacitor inherently including an insulator (sections 0010-0057; 0089-0098).

b) It is conventional in chip packaging and power supply/interconnect technology art to one or more power supply sources or power pods connecting various connectors and components in a power module. Belady teaches a power module having a variety of electrical components including a substrate, microprocessor/die, heat sink, etc. where power supply is arranged through a conventional power pod (Col. 9, lines 17-23; Col. 8-10).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the elements a) and b) as taught by Belady, Hembree et al. and Dibene, II et al. ('804 patent) so that the desired flexibility in power supply arrangement can be achieved and mechanical coupling and the component support can be improved in Dibene, II et al's ('113 patent) package.

Regarding claim 7, Dibene II, et al. ('113 and '804 patents), Belady and Hembree et al. teach substantially the entire claimed structure as applied to the claim 78 above, wherein Dibene II et al. ('113 patent) further teach the PCB/package frame being made of an electrically conductive surfaces/sections using conventional circuit board fabrication processing including etching and metallization (Col. 8, lines 24-37) to withstand conditions/temperature of normal IC operation (Col. 3, 4 and 7-16)

Regarding claim 7, making or depositing the frame do not distinguish over Dibene II et al., ('113 and '804 patents), Belady and Hembree et al., regardless of the process for forming the frame, because only the final product is relevant, not the process of making such as "molding/stamping/etching, etc. or laminating ". Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marrosi et al., 218 USPQ 289, all of which make it clear that it is the patentability and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not . Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 706.03(e).

Regarding claim 9, Dibene II, et al. ('113 and '804 patents), Belady and Hembree et al. teach substantially the entire claimed structure as applied to the claim 78 above, wherein Dibene II et al. ('113 patent) further teach a heat sink/heat spreader plate assembly (1006/1010/1004 in Fig. 10-11B) being bonded to/supported on the PCB/package frame (Col. 9, line 40-67).

Regarding claims 65-69, Dibene II, et al. ('113 and '804 patents), Belady and Hembree et al. teach substantially the entire claimed structure as applied to the claim 84 above, wherein

Dibene II et al. ('113 patent) further teach:

- the package frame being configured to be functional as the PGID for the module and being in a form of a ring having a central aperture (604 in Fig. 6A/6B; Col. 8, line 26)
- the package frame/PGID comprising two separate components/sections (see 1402 and 1404 in Fig. 14) being positioned on the respective section of the substrate (Col. 10, lines 35- Col. 11), the corner edges of the sections having rounded corners, and
- the package frame/PGID comprises two separate components/sections including corner edges (see 1402 and 1404 in Fig. 14) being positioned on the respective section of the substrate (Col. 10, lines 35- Col. 11), the corner edges having rounded corners.

Regarding claim 70, Dibene II, et al. ('113 and '804 patents), Belady and Hembree et al. teach substantially the entire claimed structure as applied to the claim 84 above, wherein Dibene II et al. ('113 patent) teach the package frame/PGID and the substrate being made of conventional circuit board material comprising insulating material/portions and metallized components/circuit layers (Col. 8, line 6; Col. 9, line 10), the package frame/PGID and the substrate having similar thermal properties such as coefficient of thermal expansion (CTE).

Regarding claims 71-73, Dibene, II et al. ('113 and '804 patents), Belady and Hembree et al. teach substantially the entire claimed structure as applied to claim 84 above, except the PGID having a ground side and power side portions and having insulating couplers separating the power and ground portions and providing an aid in the structural integrity of the PGID.

Dibene, II et al. ('113 patent) further teach the package frame/PGID comprising:

- plated through-holes and electrically conductive surfaces/pads (610, 616A/B respectively in Fig. 6A/B; Col. 8, lines 25-50) being electrically connected to a conductive interconnect spacer having electrically conductive portions (612A/612B in Fig. 6A), the conductive layer/plating being copper (Cu)
- the conductive interconnect spacer providing dual functions including a mechanical support/coupling with the substrate and two separate conductive

- paths 616A and 616B in Fig. 6A/6B) including a first power path and a second ground path respectively in a coaxial arrangement (Col. 8, lines 50-68), and
- the electrically conductive portions of the conductive interconnect spacer being separated by an insulating dielectric portion/coupling section (612 C in Fig. 6A; Col. 8, lines 37-47).

Dibene, II et al. ('113 patent) further teach in another embodiments of Fig. 13 and 14, the PGID configuration comprising power and ground conductive paths being provided in two concentric metal rings electrically isolated from each other (see 1306/1304 and 1404/1402 respectively in Fig. 13 and 14; Col. 10, lines 35- Col. 11, line 15) and being bonded/soldered to provide an integral structure providing the desired power/ground paths from the die to the substrate.

Regarding claims 74 and 75, Dibene II, et al. ('113 and '804 patents) Belady and Hembree et al. teach substantially the entire claimed structure as applied to the claim 84 above, wherein Dibene II et al. ('113 patent) further teach a heat sink/heat spreader plate/assembly (1006/1010/1004 in Fig. 10-11B) being integrally bonded to/coupled/supported on the package frame/PGID (Col. 9, line 40-67) such that the package frame/PGID and the IC die are in between the spreader plate and the substrate (see 602, 1006/1004, 302 and 702 respectively in Fig. 6A-11B).

Allowable Subject Matter

4. Claims 2, 3 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 571-272-1663. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's acting supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAN or Public PAG. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAG system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). Any inquiry of a general nature or relating to the

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status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

NP

11-26-05



NITIN PAREKH

PATENT EXAMINER

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